INCH-POUND

MIL-PRF-28861B
AMENDMENT 3
31 March 1998
SUPERSEDING
AMENDMENT 2
2 August 1996

PERFORMANCE SPECIFICATION

FILTERS AND CAPACITORS, RADIO FREQUENCY/ELECTROMAGNETIC
INTERFERENCE SUPPRESSION, GENERAL SPECIFICATION FOR

This amendment forms a part of MIL-PRF-28861B, dated 31 January 1994, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 2

2.1.1, SPECIFICATIONS, FEDERAL, delete "FF-S-85", "FF-S-92", and QQ-S-571" and their titles.

PAGE 3

2.1.1, STANDARDS, MILITARY, delete "MIL-STD-45662" and its title.

2.2, before "AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)", add the following:

"AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/J-STD-006 - Requirements for Electronic Grade Solder Alloys and Fluxed and Non-fluxed Solid Solders for Electronic Soldering Applications.

ANSI/NCSL Z540-1-1994 - General Requirements for Calibration Laboratories and Measuring and Test Equipment.

(Application for copies should be addressed to the American National Standards Institute (ANSI), 11 West 42nd Street, New York, NY 10036.)"

2.2, following "Electronic Industries Association (EIA)" list of documents, add the following:

"INTERNATIONAL ORGANIZATION FOR STANDARDS (ISO)

ISO 10012-1 - Quality Assurance Requirements for Measuring Equipment, Part 1: Meteorological Confirmation System for Measuring Equipment.

(Application for copies should be addressed to the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.)"

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3.3, delete in its entirety.

3.6, delete and substitute:

"3.6 Interface and physical dimensions. Filters shall meet the interface and physical dimensions specified (see 3.1)."

3.6.1, delete and substitute:

"3.6.1 Performance. Filter performance shall be such that none of the components of the filter are over-stressed during operation as electrically and mechanically specified herein. No degradation, unless allowed for herein, shall occur during any 100-percent screens specified herein. The filter shall meet the specified electrical characteristics at all operating temperatures, voltages, currents, or any combinations thereof as specified herein. The insertion loss requirements between any two adjacent specified frequencies shall be that of the lower of the two frequencies unless otherwise specified."

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3.6.2, delete and substitute:

"3.6.2 Case. Filters shall be enclosed in a suitable case in order to pass the performance requirements of this specification. The case shall be hermetically sealed or non-hermetically sealed as specified (see 3.1 and 6.4.2). The case shall protect the filter components from damage under all test conditions specified and prevent leakage of impregnant or filling compound. All metallic surfaces shall be free from insulating protective finishes except as specified."

3.6.3e, delete in its entirety.

3.6.3.1, delete and substitute:

"3.6.3.1 Tin-plated or tin-lead plated. T code case finish filters (see 1.2.1.2 and 3.1) shall be tin plated (except that the minimum lead content shall be 3 percent), tin-lead plated, or hot-solder dipped. Use of pure tin plating is prohibited. For guidance on tin and tin-lead finishes, see 6.5.1 and 6.5.2."

3.6.3.2, delete and substitute:

"3.6.3.2 Silver-plated. S code case finish filters (see 1.2.1.2 and 3.1), shall be silver plated. For guidance on silver finishes see 6.5.3."

3.6.3.3, delete and substitute:

"3.6.3.3 Gold-plated. G code case finish filters (see 1.2.1.2 and 3.1), shall be gold plated. For guidance on gold finishes see 6.5.4."

3.6.3.4, delete in its entirety.

PAGE 6

3.6.5, delete the second, third, and fourth sentences.

3.6.5.1, delete in its entirety.

3.6.6, delete and substitute:

"3.6.6 Inductive elements. Unless otherwise specified, the wire used when winding inductors shall have a minimum diameter of .004 inch (0.10 mm) and shall be capable of meeting the requirements of type K or M of J-W-1177, or equivalent. Inductors shall be inspected to ensure that the wire is not kinked or nicked and that the insulation is continuous. For class S filters only, cores and ferrite beads shall be 100 percent inspected for chipped coating, cracks, chips, and material cracks and chips."

3.6.7.2, delete and substitute:

"3.6.7.2 Class S filters. Capacitor elements used in class S filters shall meet the following:

a. The applicable requirements of MIL-C-123 except for qualification.

b. Capacitor dielectric voltage breakdown. When tested as specified in 4.6.28, no failure shall occur at an applied voltage of less than 6 X rated voltage or 1200 V dc (whichever is less). A failure is defined as a steady-state current above one milliampere.

c. Groups A and B inspections of MIL-C-123 shall be performed with the exception of the group B thermal shock and life tests."

PAGE 7

3.6.8 and 3.6.8.1, delete and substitute:

"3.6.8 Solders. When solders are used in filters covered by this specification, the solder shall have a liquid point not less than 280°C or as specified (see 3.1). For further information and guidance on soldering filters, see 6.9."

3.6.8.3, delete in its entirety.

PAGE 8

3.22, add the following: "After the test, in Group B inspection, Class B filters shall meet the following requirement:

Insertion loss (+25°C): Shall meet initial requirements (see 3.1)."

PAGE 10

4.1.4, line four, delete "MIL-STD-45662" and substitute "ANSI/NCSL Z540-1, ISO 10012-1, or equivalent as approved by the qualifying activity".

PAGE 11

4.4.2c., delete in its entirety.

PAGE 14

4.5.2, second sentence, delete and substitute: "Other screening inspections may be applied at the option of the manufacturer, as approved by the qualifying activity."

4.5.2.1, first sentence, delete and substitute: "Rework of class S filters is not allowed unless the rework procedure has been approved by the qualifying activity."

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4.5.4.2, first sentence, delete "as specified in the baseline documentation".

4.5.4.2, line four, delete "to the same baseline/revision".

PAGE 21

* 4.6.2.2.1d, delete and substitute:

"d. Measurements after test: Insulation resistance shall be measured as specified in 4.6.13.2 within 24 hours after completion of voltage conditioning."

* 4.6.2.2.2f, delete and substitute:

"f. Measurements after test: Insulation resistance shall be measured as specified in 4.6.13.2 within 24 hours after completion of voltage conditioning."

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* 4.6.13.2b, delete and substitute:

"b. Filters shall be stabilized at +125°C ± 3°C."

* 4.6.12.2d, delete and substitute:

"d. Test potential: Rated dc voltage, applied for two minutes maximum.
Charging current: 50 mA maximum."

PAGE 30

4.6.16, add the following:

"f. Measurements after test (Group B inspection only): Class B filters shall be subjected to the insertion-loss test (see 4.6.5)."

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4.6.22e, delete and substitute:

"e. Measurements after the test (Qualification inspection only): Filters shall be subjected to the insertion-loss test (see 4.6.5)."

PAGE 32

4.6.25.2a, line two, delete "SN62WRMAP3 solder per QQ-S-571" and substitute "PB36AWB6 or PB36AWB7 solder per ANSI/J-STD-006".

PAGE 35

After 6.4.1 add the following new paragraph:

"6.4.2 Case. Two types of cases are used for filters covered by this specification; hermetically sealed and nonhermetically sealed. The hermetically sealed filters are enclosed in metallic cases with glass seals, or equivalent, in order to meet the requirements of the seal test. Nonhermetically sealed filters are enclosed in metallic cases with potted end seals."

6.5, delete and substitute:

"6.5 Finishes.

"6.5.1 Tin-plated finish. Pure tin plating is prohibited (see 3.6.3.1) since it may result in tin whisker growth. Tin whisker growth could adversely affect the operation of electronic equipment systems. For additional information on this matter, refer to ASTM B545 (Standard Specification for Electrodeposited Coating of Tin). Based on past experience, tin plating in accordance with MIL-T-10727 or electro-tin fused (with a minimum tin content of 3 percent) has been used successfully to meet the requirements of this specification.

"6.5.2 Tin-lead plated. Based on past experience, tin-lead plating in accordance with MIL-P-81728 or hot-solder dipped (40 percent to 60 percent tin in accordance with ANSI/J-STD-006) has been used successfully to meet the requirements of this specification.

"6.5.3 Silver-plated. Based on past experience, silver plating in accordance with QQ-S-365 has been used successfully to meet the requirements of this specification.

"6.5.4 Gold-plated. Based on past experience, gold plating in accordance with MIL-G-45204, (type II, grade C for broadband and high frequency bolt-style or type III, grade A for solder-in styles) has been used successfully to meet the requirements of this specification."

PAGE 36

After 6.8 add a new paragraph as follows:

"6.9 Soldering. When soldering ceramic capacitors and glass seals, heat shall be applied in such a way that it causes an even radial distribution over the surface. Methods such as preheat, slow heating, and limiting the maximum temperature shall be employed to minimize the occurrence of thermally induced cracks, crazing, chipping, or other physical damage. The same precautions used in heating shall be applied in cooling down the device. The solder joint where the internal wire exits through a glass seal and all other solder joints on solder-in style filters shall be made with solder per ANSI/J-STD-006, or equivalent, having a liquid point not less than 280°C or as specified (see 3.1)"

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APPENDIX B, delete in its entirety.

NOTE: The margin of this amendment is marked with an asterisk to indicate where a change (addition) from the previous amendment was made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracy in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous amendment.

Custodian:
Army - CR
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Air Force - 85
NASA - NA

Preparing activity:
DLA - CC

(Project 59GP-0162)

Review activities:
Army - AR, AT, AV, CR4, MI
Navy - AS, CG, MC, OS, SH
Air Force - 19, 99